

A Strategic Approach to Medical Care for Exploration Missions

E. Antonsen^{1,2}, M Canga²

¹Baylor College of Medicine, 1504 Taub Loop, Houston, TX 77030, ²Human Research Program, NASA Johnson Space Center, 2101 NASA Parkway, Houston, TX 77058

Exploration missions will present significant new challenges to crew health, including effects of variable gravity environments, limited communication with Earth-based personnel for diagnosis and consultation for medical events, limited resupply, and limited ability for crew return. Providing health care capabilities for exploration class missions will require system trades be performed to identify a minimum set of requirements and crosscutting capabilities which can be used in design of exploration medical systems. Current and future medical data, information, and knowledge must be cataloged and put in formats that facilitate querying and analysis. These data may then be used to inform the medical research and development program through analysis of risk trade studies between medical care capabilities and system constraints such as mass, power, volume, and training. These studies will be used to define a Medical Concept of Operations to facilitate stakeholder discussions on expected medical capability for exploration missions. Medical Capability as a quantifiable variable is proposed as a surrogate risk metric and explored for trade space analysis that can improve communication between the medical and engineering approaches to mission design. The resulting medical system approach selected will inform NASA mission architecture, vehicle, and subsystem design for the next generation of spacecraft.